

being merely reproductions or duplicates of those already photographed? A partial answer to this query seems to be indicated by the vast number of new patterns that were obtained from the past winter's storms, greater than any previous single winter has furnished. This fact, coupled with the certainty that the number of individual crystals that go to form the snowfall of even one storm, is so vast that one, or many observers, may never hope to find and see anything more than an absolutely insignificant fraction of the whole, leads us to the conclusion that, during all future time and so long as there shall be observers to search for them, new designs will continue to be found to delight the eye with their beauty.

Another interesting thought that arises is: That it is extremely improbable that anyone has as yet found, or, indeed,

ever will find, the one preeminently beautiful and symmetrical snow crystal that nature has probably fashioned when in her most artistic mood.

In closing, it seems hardly necessary to add that this most charming and delightful branch of nature study is as yet at its beginning; it still possesses the charm of novelty; many of its problems are unsolved, and many will find its pursuit a source of great pleasure and instruction.

CORRIGENDA.

On page 397 of the MONTHLY WEATHER REVIEW for August, 1902, below the title of the article on "Ocean Currents," insert "Reprinted with slight changes, from pages 135-142 of the National Geographical Magazine.

REPORT OF THE CHIEF OF THE WEATHER BUREAU FOR THE FISCAL YEAR ENDING JUNE 30, 1902.

Dated October 15, 1902.

I have the honor to submit a report of the operations of the Weather Bureau during the fiscal year that ended June 30, 1902.

FORECASTS AND WARNINGS.

The most important tropical storm of the year appeared first as a feeble disturbance in the subtropical region north of Cuba August 9, 1901. It advanced thence over the southern part of the Florida Peninsula during the 10th and 11th, and recurved westward over the Gulf of Mexico by the morning of the 12th. Moving westward the storm increased greatly in intensity during the 13th and 14th, and during the 14th and 15th it recurved northward over the Louisiana coast, attended by gales of hurricane force. Warnings in connection with this storm were begun on the 10th. The estimated damage to property along the Louisiana coast amounted to over \$1,000,000, and according to the estimate of the secretary of the Mobile Chamber of Commerce the value of property saved by the warnings of the Weather Bureau aggregated several millions of dollars.

The North Atlantic and West Indian forecast and storm-warning service was continued in successful operation during the year. Forecasts, for the first three days out, for the use of steamers bound for European ports were issued daily at 8 a. m. and 8 p. m.; American and European shipping interests were notified of the character and probable course of the more severe storms that passed eastward from the American coast.

The following letter, dated November 15, 1901, addressed by the secretary of Lloyd's, London, to the Chief of the United States Weather Bureau, at Washington, indicates the degree of interest that is being taken in the Weather Bureau warnings by representatives of the commercial and shipping interests of the North Atlantic:

I am instructed to express to you the best thanks of the committee of Lloyd's for the forecasts of bad weather in the Atlantic with which you have been so good as to allow them to be favored, and I am desired to convey to you the congratulations of my committee on the infallibility of the predictions that have been supplied by these forecasts.

On the morning of November 1, 1901, the following message was telegraphed to the Weather Bureau offices at Hamilton, Bermuda; New York, N. Y.; Philadelphia, Pa.; and Boston, Mass.: "Severe disturbance moving northward east of Turks Island will probably pass near Bermuda Saturday."

The following article from the Bermuda Colonist of November 6, 1901, verifies the accuracy of the advices furnished:

The hurricane that was predicted by the Washington Weather Bureau for Saturday arrived on time and raged around the islands for twenty-four hours. All the incoming steamers were delayed in consequence, and those that were southward bound, the New York mail steamers especially, experienced exceedingly heavy weather. The growing crops throughout

the colony have suffered somewhat, and the storm damage to property has been considerable. The principal damage reported has been occasioned to government property about the islands in the Great Sound, where the prisoners of war are interned, and it is said that the preliminary estimate of the damage reaches the sum of £2000. Reports from the westward state that the contractors for the dock-yard extension works have also sustained some loss; a large boat used for conveying laborers and a large quantity of balk timber got adrift.

The first general frost-bearing cool wave of the fall of 1901 swept from the northeastern Rocky Mountain slope southward to Arkansas and Tennessee and eastward to the North Atlantic coast States, during September 17-20. Ample warnings were distributed throughout the districts visited by the frosts of the period referred to.

The cold waves of December, 1901, were exceptionally severe in the Lake region, the central valleys, and the Southern States. The following are among press comments made regarding these cold waves:

The cold-wave warning was issued fully thirty-six hours in advance of the cold changes; it was telegraphed to all the important towns of the State, from which points it was distributed by mail. It is learned that the information was posted in over 1500 places in the State yesterday morning, which demonstrates the very thorough and rapid system the Weather Bureau now has for getting such warnings before those who are actually interested.—*Montgomery (Ala.) Advertiser of December 10, 1901.*

There has been some injury in the citrus-fruit and winter-vegetable districts, but, thanks to the early warnings of the Weather Bureau, those who know how to burn and smoke as a preventive from frost effects saved much property and gave a new demonstration of the efficacy of the protective measures which have been brought to high development in California.—*Pacific Rural Press, San Francisco, December 17, 1901.*

The Weather Bureau gave ample notice of the coming of the cold wave, and its predictions have seldom been more accurate as to the extent of the wave, the territory that would be affected by it, and the degree of cold the thermometer would record; and this warning did much to prevent any serious damage to the cane crop from the freeze by giving the planters time to prepare for it.—*New Orleans Times-Democrat, December 17, 1901, editorial.*

Much credit is due the Pittsburg station of the United States Weather Bureau for its truthful and timely predictions in the recent sudden changes of weather in this section. Warnings far in advance of the first local intimation of a cold snap were sent to shippers of perishable goods, and thus much damage was averted that otherwise would have resulted. When the continuous rains and heavy snows set in, warnings were also sent out notifying property holders of the imminent danger of a flood.—*Pittsburg Post, December 16, 1901, editorial.*

The following warnings, telegraphed from Washington to Jacksonville for distribution in Florida, resulted in the protection of more than \$1,000,000 worth of fruit, vegetables, and other property, and a direct saving of \$540,000:

WASHINGTON, D. C., December, 19, 1901.

Center of low moving rapidly southeastward over Gulf. Minimum temperature to-night in central and north Florida will equal last night, and outlook is for lower temperature Friday night. All precautions against damage by cold justified for next two nights.